

CLAIMS

We claim:

1. A polymer electrolyte comprising:

a modified polymeric material, said modified polymeric material including a halogen containing polymer having an enhanced halogen level, said enhanced halogen level relative to a halogen content of said halogen containing polymer formed from polymerization of its monomer;

a salt of an alkali metal; and

an aprotic solvent, wherein said salt and said aprotic solvent are integrated with said modified polymeric material.

2. The polymer electrolyte of claim 1, wherein said halogen containing polymer includes at least one chlorine containing polymer.

3. The polymer electrolyte of claim 2, wherein said chlorine containing polymer is polyvinylchloride (PVC).

4. The polymer electrolyte of claim 3, wherein said polyvinylchloride (PVC) is suspension polyvinylchloride (PVC).

1 5. The polymer electrolyte of claim 3, wherein said polyvinylchloride (PVC) is
2 emulsion polyvinylchloride (PVC).

1 6. The polymer electrolyte of claim 1, wherein said modified polymeric material
2 comprises C-PVC, said C-PVC having 60-72 wt % chlorine.

1 7. The polymer electrolyte of claim 6, wherein said polymer electrolyte comprises
2 10-40 wt % of said C-PVC.

1 8. The polymer electrolyte of claim 1, wherein said alkali metal salt is at least one
2 selected from the group consisting of LiClO₄, LiBF₄, LiAsF₆, LiPF₆, LiCF₃SO₃ and
3 LiN(CF₃SO₂)₂.

1 9. The polymer electrolyte of claim 1, wherein said electrolyte comprises from 3-20
2 wt % of said salt of an alkali metal.

1 10. The polymer electrolyte of claim 1, wherein as said aprotic solvent is at least one
2 selected from the group consisting of propylene carbonate, ethylene carbonate, dimethyl
3 carbonate, gamma-butyrolactone, 1,3-dioxolane and dimethoxyethane.

1 11. The polymer electrolyte of claim 1, wherein said electrolyte comprises 40-82 wt
2 % of said aprotic solvent.

1 12. A rechargeable battery, comprising:

2 an anode containing an alkali metal;

3 a cathode; and

4 a polymer electrolyte formed from a modified polymeric material, said modified
5 polymeric material including a halogen containing polymer having an enhanced halogen level,
6 said enhanced halogen level relative to a halogen content of said halogen containing polymer
7 formed from polymerization of its monomer, a salt of an alkali metal and an aprotic solvent,
8 wherein said salt and said aprotic solvent are integrated with said modified polymeric material.

9 13. The rechargeable battery of claim 12, wherein said halogen containing polymer
10 comprises at least one chlorine containing polymer.

11 14. The rechargeable battery of claim 13, wherein said modified polymeric material
12 comprises chlorinated polyvinylchloride (C-PVC).

13 15. The rechargeable battery of claim 12, wherein in said anode comprises lithium.

14 16. The rechargeable battery of claim 12, wherein said anode comprises a lithium
15 alloy.

1 17. The rechargeable battery of claim 16, wherein as said lithium alloy is at least one
2 selected from the group consisting of lithium-aluminum, lithium-aluminum-silicon, lithium-
3 aluminum-cadmium, lithium-aluminum-bismuth and lithium-aluminum-tin.

1 18. The rechargeable battery of claim 12, wherein said anode comprises a lithium-ion
2 material.

1 19. The rechargeable battery of claim 12, wherein said cathode comprises a metal
2 oxide.

1 20. The rechargeable battery of claim 12, wherein said cathode comprises a lithium-
2 transition metal oxide.

1 21. The rechargeable cell of claim 12, wherein said cathode is at least one selected
2 from the group consisting of MnO_2 , LiMn_2O_4 and vanadium oxides (V_xO_y).

1 22. The rechargeable cell of claim 12, wherein said cathode comprises a organic
2 polymer.

1 23. The rechargeable cell of claim 12, wherein said cathode is at least one selected
2 from the group consisting of polyviologen, polyacetylene and polypyrrole.

1 24. The rechargeable cell of claim 12, wherein said cathode comprises a sulfur
2 containing material.

1 25. The rechargeable cell of claim 12, wherein said cathode is at least one selected
2 from the group consisting of TiS_2 , S, polysulphide and polythiophene.

1 26. A polymer comprising:
2 a modified polymeric material, said modified polymeric material including a
3 halogen containing polymer having an enhanced halogen level, said enhanced halogen level
4 relative to a halogen content of said halogen containing polymer formed from polymerization of
5 its monomer.

1 27. A method for preparing solid polymer electrolytes, comprising the steps of:
2 providing a halogen containing polymer;
3 halogenating said halogen containing polymer, wherein an enhanced halogen
4 containing modified polymer material results, said enhanced halogen level relative to a halogen
5 content of said halogen containing polymer formed from polymerization of its monomer;
6 blending together said modified polymer material, at least one salt of an alkali
7 metal and at least one aprotic solvent.

1 28. The method of claim 27, wherein said halogen containing polymer comprises at
2 least one chlorine containing polymer.

1 29. The method of claim 28, wherein said chlorine containing polymer comprises
2 polyvinylchloride (PVC).

1 30. The method of claim 29, wherein said polyvinylchloride (PVC) is suspension
2 polyvinylchloride (PVC).

1 31. The method of claim 29, wherein said polyvinylchloride (PVC) is emulsion
2 polyvinylchloride (PVC).

1 32. The method of claim 27, wherein said modified polymeric material comprises
2 chlorinated polyvinylchloride (C-PVC).

1 33. The method of claim 32, wherein said halogenation comprises chlorination, said
2 PVC being chlorinated by a process of homogeneous or heterogeneous chlorination.

1 34. The method of claim 27, wherein said blending step includes comprises addition
2 of a volatile solvent.

1 35. The method of claim 34, further comprising the step of removing said volatile
2 solvent.

